

IMPROVED LEADFRAME-BASED CHIP SCALE PACKAGE

RELATED APPLICATION

The present application claims the benefit of priority based on U.S. Provisional Application No. 60/284,029, filed on April 16, 2001, assigned to the same assignee as the present invention, and entitled "Improved Leadframe-Based Chip Scale Package," which is herein fully incorporated by reference.

FIELD OF THE INVENTION

The present invention relates to leadframe-based CSPs (Chip Scale Packages) and, more particularly, to leadframe-based CSPs with an enhanced leadframe that promotes mold compound-leadframe adhesion and improves RF (Radio Frequency) grounding characteristics.

BACKGROUND OF THE INVENTION

Chip Scale Packages (CSPs) are packages that incorporate chip(s) that satisfy certain dimensional requirements in which the package area is slightly larger than the chip(s) area but smaller than conventional chip packages. Leadframe-based CSPs are CSPs that do not have the peripheral leads that typically extend out from conventional chip

packages. Due to this structure and design, the leadframe-based CSPs are known for their cost-effectiveness, compactness and improved RF performance. A variety of different types of leadframe-based CSPs are available in the market, such as Micro-Lead Packages (MLPs), Micro-Lead-Frames (MLFs), Leadless Package Chip Carriers (LPCC), etc. The Joint Electron Device Engineering Council (JEDEC), which is a committee that establishes industry standards and packaging outlines, has defined certain package outlines for leadframe-based CSPs. In the package outlines known as "MO-220," the committee has classified the leadframe-based CSPs as HP-VFQFP-Ns or HP-WFQFP-Ns. More information about such packages is available at the website of http://www.jedec.org/home/about_jedec.htm.

Figure 1A is a plan view of a conventional leadframe-based CSP such as a conventional LPCC, and Figure 1B is a cross-sectional view of the conventional leadframe-based CSP cut along line 1B-1B of Figure 1A. As shown in Figures 1A and 1B, the conventional leadframe-based CSP 5 includes a leadframe 10 having a center pad or die attach pad 12 centrally located therein and a plurality of wire bonding pads 14 peripherally located therein, at least one chip or die 16 disposed on the die attach pad 12, a plurality of bonding wires 18 for electrically connecting the die 16 to the wire bonding pads 14, and a mold compound 20 (shown in Fig. 1B), such as plastic, for encapsulating these components in a package structure. Typically, the mold compound 20 is molded around the leadframe 10 after the die 16 and the bonding wires 18 have been mounted on the leadframe 10. The mold compound 20 enhances the fixture of these components in the package and prevents electrical short circuits between the bonding wires and the die(s)

and the introduction of moisture, dust and other contaminants into the package.

A significant problem arises, however, in such conventional leadframe-based CSPs because the mold compound often does not properly adhere to the surface of the die attach pad. This problem can create certain gaps between the surfaces of the mold compound and the die attach pad (also known as delamination), which increases the likelihood of moisture and other contaminants seeping into the package through such gaps. This degrades the Moisture Sensitivity Level (MSL) of the package which indicates the moisture receptivity of a chip package. The degradation of the MSL and the inadequate bonding of the mold compound to the die attach pad degrades the electrical performance of the conventional leadframe-based CSPs.

Accordingly, there is a need for an improved leadframe-based CSPs that overcomes the adhesion and moisture sensitivity problems of conventional leadframe-based CSPs.

SUMMARY OF THE INVENTION

The present invention provides an improved leadframe-based CSP capable of improving the adhesion of a mold compound to a die attach pad. Particularly, the leadframe-based CSP of the present invention provides an aperture in the die attach pad which increases the adhesion surface area of the die attach pad for the mold compound. This improves the performance characteristics and reliability of the leadframe-based CSP.

Accordingly, the present invention is directed to a chip package comprising a leadframe including a die attach pad centrally located therein and a plurality of wire bonding pads peripherally located therein; at least one aperture placed in the die attach